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(2)

PERFORMANCE ORIENTED PACKAGING TESTING

OF

POLYSTYRENE FOAM CONTAINER FOR THE MK 117 MOD 0

MARINE SMOKE AND ILLUMINATION SIGNAL

BY:

KERRY J. LIBBERT

MECHANICAL ENGINEER

Performing Activity:
Crane Division
Naval Surface Warfare Center
Crane, Indiana 47522-5000

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FINAL

Sponsoring Organization:
Naval Weapons Station Earle
Program Management Office - Code 50
Colts Neck, New Jersey 07722-5000

Prepared by:

K. J. Libbert

Reviewed by:

R. F. Sanders

Reviewed by:

J. W. Puckett

Approved by:

D. N. Montgomery

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Kerry J. Libbert

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Commander
Code 4045
NAVSURFWARCENDIV
300 Highway 361
Crane IN 47522-5001

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Commander
Code 4022
NAVSURFWARCENDIV
300 Highway 361
Crane IN 47522-5001

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13. Abstract (Maximum 200 words)

The polystyrene foam container used to transport and store five MK 117 Mod 0 marine smoke and illumination signals was tested to Performance Oriented Packaging criteria established by the Code of Federal Regulations Title 49 CFR. The container was tested with a gross weight of 20 kg (44 pounds).

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Performance Oriented Packaging Polystyrene foam container MK 11, Mod 0 Marine Smoke and Illumination Signal	5
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17. Security Classification of Report	18. Security Classification of This Page	19. Security Classification of Abstract	20. Limitation of Abstract
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INTRODUCTION

This Performance Oriented Packaging (POP) test was performed to ascertain whether the polystyrene foam shipping and storage container for five MK 117 Mod 0 Marine Smoke and Illumination Signals meets the Packing Group II requirements specified by the Code of Federal Regulations, Title 49 CFR, Parts 107 through 178, dated 31 December 1991. The objectives were to evaluate the adequacy of the container in protecting the hazardous materials.

The container consists of two identical halves held together by glass filament tape.

TESTS PERFORMED

1. Drop Test

This test was performed in accordance with Title 49 CFR, Part 178, Subpart M, Sec. 178.603. One container was used for each drop orientation. The drop height was 1.2 meters and the drop sequence was as follows:

a. Flat on Bottom
b. Flat on Top
c. Flat on Long Side
d. Flat on Short Side
e. One Corner

The test was performed at ambient temperature (70° ± 20°F). The contents of the container should be retained within its packaging and exhibit no damage liable to affect safety during transport.

2. Stacking Test

This test was performed in accordance with Title 49 CFR, Part 178, Subpart M, Sec. 178.606. Three different containers were used, each with a stack weight of 1628 pounds. This represents the weight imposed on the bottom container of a sixteen-foot stack of like containers weighing 44 pounds each. The test was performed for 24 hours. After the allowed time, the weight was removed and the container examined. Any leakage, deterioration, or distortion which could adversely affect transport or reduce its strength or cause instability in stacks of packages is cause for rejection.

3. Base Level Vibration Test

This test was performed in accordance with Title 49 CFR, Part 178, Subpart M, Sec. 178.608. Three sample containers were loaded with inert signals and closed as for shipment. Each container was placed on a vibrating platform that had a vertical double-amplitude (peak-to-peak displacement) of one inch. The packages were constrained horizontally to prevent them from

falling off the platform, but were free to move vertically, bounce and rotate. The test was performed for one hour at a frequency that caused each point of the container bottom to be raised from the platform 1.6 mm. A 1.6 mm thick metal strip was passed between the bottom of the container and the platform.

PASS/FAIL

1. Drop Test

The criteria for passing the drop test is outlined in Title 49 CFR, Part 178, Subpart M, Sec. 178.603(f): A package is considered to successfully pass the drop test if for each sample tested, no rupture occurs which would permit spillage of loose explosive substances or articles from the outer packaging.

2. Stacking Test

The criteria for passing the stacking test is outlined in Title 49 CFR, Part 178, Subpart M, Sec. 178.606: No test sample may show any deterioration which could adversely affect transportation safety or any distortion likely to reduce its strength, cause instability in stacks of packages, or cause damage to inner packagings likely to reduce safety in transportation.

3. Base Level Vibration Test

The criteria for passing the Base Level Vibration Test is outlined Title 49 CFR, Part 178, Subpart M, Sec. 178.608: Immediately following the period of vibration, each package must be removed from the platform, turned on its side and observed for any evidence of leakage. A packaging passes the vibration test if there is no rupture or leakage from any of the packages. No test sample should show any deterioration which could adversely affect transportation safety or any distortion liable to reduce packaging strength.

TEST RESULTS

1. Drop Test

Satisfactory, with additional tape as described below.

2. Stacking Test

Satisfactory.

3. Base Level Vibration Test

Satisfactory.

DISCUSSION

1. Drop Test

After each drop the container was inspected for any damage which would be cause for rejection. The four flat drops caused no damage to any of the containers, but when container number 5 was dropped on its corner the end of one container half cracked. The corner drop was repeated on another container, after additional tape was added longitudinally 4.50 inches from each side. When the corner drop was repeated, the impacted corner was flattened, but the container remained intact and there was no spillage of contents.

2. Stacking Test

Three containers were individually tested. Each container was visibly inspected after the 24-hour period was over. There was no leakage, distortion, or deterioration of the container as a result of this test.

3. Base Level Vibration Test

Immediately following the vibration test, each container was removed from the platform, turned on its side and observed for any evidence of leakage. All containers remained securely closed and there was no evidence of leakage of contents.

REFERENCE MATERIAL

Code of Federal Regulations Title 49 CFR, Parts 107-178.

DISTRIBUTION LIST

Commander
Crane Division
Naval Surface Warfare Center
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Crane, IN 47522-5000

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Naval Weapons Station Earle
Code 50 and Code 50232
Colts Neck, NJ 07722-5000

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ATTN: DTIC/FDAC (Virginia Guidi)
Bldg. 5, Cameron Station
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SMCAR-ESK
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DATA SHEET

CONTAINER:
Polystyrene Foam Container for Five Marine Smoke and Illumination Signals

POP MARKING:
u n 4H1/Y20/S/**
USA/DOD/NAD

Type: 4H1

UN Code: 1.3G

Specification Number:
MIL-P-19644

Material:
Polystyrene Foam

Gross Weight:
20 kg
(44.0 pounds)

Dimension :
.99m L x .47m W x .13m H
(38.94" L x 18.62" W x 5.00" H)

Closure (Method/type):
Glass Filament Tape

Tare Weight:
1.3 kg
(2.8 pounds)

Additional Description: Container consists of two identical halves in accordance with Drawing 10001-2141510.

PACKAGED COMMODITY:
Marine Smoke and Illumination Signal
MK 117 Mod 0, L269, 1370-00-478-2614

Proper Shipping Name: Ammunition, Illuminating

United Nations Number: 0254

United Nations Packing Group: II

Physical State: Solid

Amount Per Container: 5

Net Weight: 15.4 kg (34.0 pounds)

PACKAGED COMMODITY USED FOR TEST:
Name: Inert Signals
Physical State: Solid

Size : .91m L x .08m Dia
(35.85"L x 3.02"Dia)
Quantity : 5
Net Weight: 18.7 kg (41.2 pounds)